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Cmld substituted cyclopentane which is not functionalized; another lubricant is a hydrocarbyl-substituted cyclopentane which is functionalized.

REMARKS

The Applicants would like to express appreciation to the Examiner for the courtesy extended to Applicants' attorney, Benjamin Bai, during a telephone interview on June 7, 2002. During the interview, the Examiner clarified the rejections set forth in the Office Action, and Applicants' attorneys discussed the pending claims and proposed claim amendments, and agreed to review the amendments.

Claims 1, 2, 11-14 and 23-37 are pending in the application, all of which have been rejected. Claims 33 and 35 have been amended to correct grammatical errors. Claims 1, 11, 12, 14, 23-26, 29, and 30 have been amended to recite the lubricant comprises hydrocarbyl substituted cyclopentanes having at least 29 carbon atoms. Support for these amendments can be found, for example, on page 10, lines 9-18. No new matter has been introduced.

RESPONSE TO REJECTION UNDER 35 U.S.C. § 103(A)

Claims 1, 2, 11-14, and 23-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stirniman et al. ("600") in view of Venier et al ("023") and Venier, Casserly and Gunsel (IDS reference).

Claims 11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stirniman et al. ("600") in view of Venier et al ("023") and Venier et al. (IDS paper) and Babb et al. ("547") (hereafter referred to as SVVB) and further in view of Patsidis et al. ("351").

Claims 12 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stirniman et al. ("600") in view of Venier et al ("023") and Venier et al. (IDS paper) and Babb et al. ("547") (hereafter referred to as SVVB) and further in view of Venier and Casserly (IDS reference from Symposium on the Chem. of Lubricants, Boston Meeting, pe-print, 35(2), 1990).

Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stirniman et al. ("600") in view of Venier et al ("023") and Venier et al. (IDS paper) and Babb et al. ("547") (hereafter referred to as SVVB) and further in view of Sanechika et al. (593) and Ng ("216").

Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stirniman et al. ("600") in view of Venier et al ("023") and Venier et al. (IDS paper) and Babb et al. ("547") (hereafter referred to as SVVB) and further in view of Tsuchiya et al. ("516") and Hayashi ("983").

Claim 1, 25, 26, 29, and 30 have been amended to recite a lubricant layer including a hydrocarbyl-substituted cyclopentane wherein the hydrocarbyl consists of carbon and hydrogen and wherein the hydrocarbyl-substituted cyclopentane comprises at least 29 carbon atoms. This claim is commensurate in scope with the showing of unexpected results of Pennzane® X-2000 v. Z-DOL® shown in Table II on page 34 of the specification.

The Applicants have amended all the independent claims to recite the cyclopentane as "having at least 29 carbons" to address the molecular weight and viscosity issues raised by the examiner. However, this amendment is not necessitated by prior art. The patent application on page 8, lines 1-6, teaches that these cyclopentanes are selected due to their low vapor pressure and desired tribological properties. Having at least 29 carbon atoms per molecule would ensure that the cyclopentane has a low vapor pressure because the lower carbon atoms for hydrocarbon the higher vapor pressure. Therefore, by reciting the lower carbon atoms, a lower molecular weight threshold is implicitly specified. No upper molecular weight is needed because the higher the molecular weight the lower the vapor pressure. Viscosity is a physical property related to molecular weight thus carbon atoms per molecule. The Applicants submit that the unexpected properties relate to the unique chemical structure of the cyclopentane and such a structure is recited in the pending claims. Therefore, the unexpected results are commensurate with the scope of the claims. As such, the pending claims, as amended, are patentable.

CONCLUSION

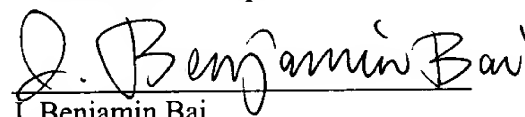
For the above reasons, Applicants respectfully submit that all pending claims, *i.e.*, claims 1, 11-14, and 23-37, are patentable over the prior art. Applicants have addressed all of the Examiner's rejections. In conjunction with the arguments above, Applicants believe that the claims are now in condition for allowance and respectfully request that the Examiner grant such an action. If any questions or issues remain in the resolution of which the Examiner feels will be advanced by a

conference with the Applicants' attorney, the Examiner is invited to contact the attorney at the number noted below.

No fees are due as a result of this Reply. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 10-0447, reference 42053.6USPT(BAI).

Respectfully submitted,

JENKENS & GILCHRIST,
A Professional Corporation

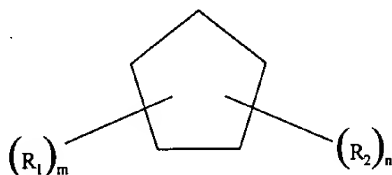
A handwritten signature in black ink that reads "J. Benjamin Bai". The signature is written in a cursive, flowing style. Below the signature is a horizontal line.

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Reg. No.: 43,481

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MARKED-UP CLAIMS PER AMENDMENT
U.S. APPLICATION SERIAL NO. 09/534,282

1. (Thrice Amended) A magnetic recording medium, comprising:
 - a non-magnetic support;
 - a magnetic layer formed on the support; and
 - a lubricant layer over the magnetic layer, the lubricant layer includes a hydrocarbyl-
substituted cyclopentane as represented by the following formula:



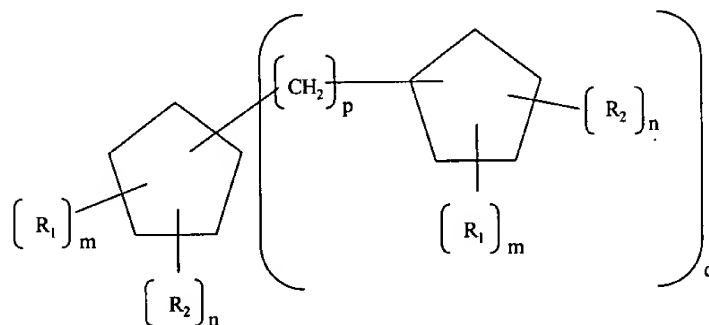
wherein R_1 and R_2 are respectively a hydrocarbyl group, and m and n are respectively zero or a positive integer and the sum of $m + n$ is greater than zero; and

wherein the hydrocarbyl consists of carbon and hydrogen and wherein the hydrocarbyl-substituted cyclopentane comprises at least 29 carbon atoms.

~~including a compound selected from the group consisting of hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, hydrocarbyl-substituted cyclopentadiene, and mixtures thereof; and~~

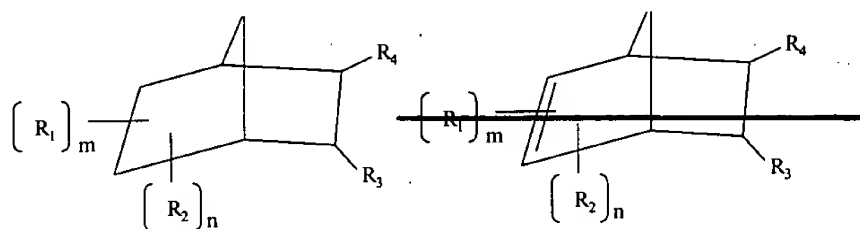
~~wherein the hydrocarbyl consists of carbon and hydrogen.~~

11. (Thrice Amended) The magnetic recording medium of claim 1, wherein the hydrocarbyl-substituted cyclopentane, ~~hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene~~ are is represented by the following respective formula formulas:



wherein p is 1, 2, 3, ..., or 10; q is 1, 2, 3, ..., or 10; m and n are zero or a positive integer;
 R_1 and R_2 are individually a hydrocarbyl group; and
 wherein the hydrocarbyl consists of carbon and hydrogen.

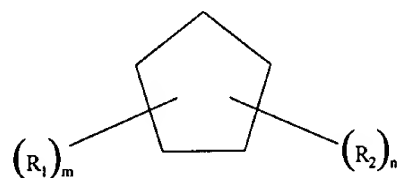
12. (Thrice Amended) The magnetic recording medium of claim 1, wherein the hydrocarbyl-substituted cyclopentane, ~~hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene~~ are is represented by the following respective formula formulas:



wherein m and n are zero or a positive integers; R_1 and R_2 individually are a hydrocarbyl group; R_3 and R_4 individually are hydrocarbyl; and

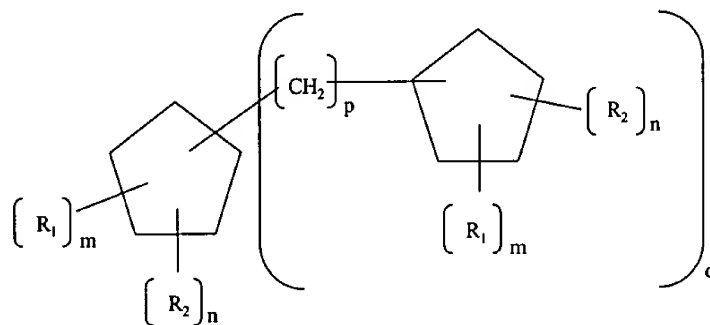
wherein the hydrocarbyl consists of carbon and hydrogen.

14. (Thrice Amended) The magnetic recording medium of claim 13, wherein the hydrocarbyl-substituted cyclopentane, ~~hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene~~ is represented by the following respective formula formulas:



wherein R_1 and R_2 are respectively a hydrocarbyl group, and m and n are respectively zero or a positive integer and the sum of $m + n$ is greater than zero; and
wherein the hydrocarbyl consists of carbon and hydrogen.

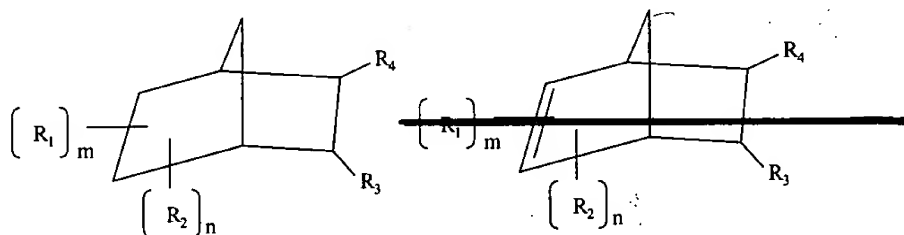
23. (Thrice Amended) The magnetic recording medium of claim 13, wherein the hydrocarbyl-substituted cyclopentane, ~~hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene~~ is represented by the following respective formula formulas:



wherein p is 1, 2, 3, ..., or 10; q is 1, 2, 3, ..., or 10; m and n are zero or a positive integer;
 R_1 and R_2 are individually a hydrocarbyl group; and

wherein the hydrocarbyl consists of carbon and hydrogen.

24. (Thrice Amended) The magnetic recording medium of claim 13, wherein the hydrocarbyl-substituted cyclopentane, ~~hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene~~ is represented by the following ~~respective~~ formula formulas:



wherein m and n are zero or a positive integers; R₁ and R₂ individually are a hydrocarbyl group; R₃ and R₄ individually are hydrocarbyl; and

wherein the hydrocarbyl consists of carbon and hydrogen.

25. (Thrice Amended) A magnetic head, comprising:

a head; and

a lubricant layer over at least a portion of the head, the lubricant layer ~~including a compound selected from the group consisting of~~ comprising a hydrocarbyl substituted cyclopentane, ~~hydrocarbyl substituted cyclopentene, hydrocarbyl substituted cyclopentadiene, and mixtures thereof;~~

wherein the hydrocarbyl consists of carbon and hydrogen and wherein the hydrocarbyl-substituted cyclopentane comprises at least 29 carbon atoms.

26. (Thrice Amended) A data storage/retrieval device, comprising:

a magnetic recording medium including a magnetic layer over a support and a lubricant layer over the magnetic layer, the lubricant layer ~~including a compound selected from the group~~

~~consisting of comprising a hydrocarbyl substituted cyclopentane, hydrocarbyl substituted cyclopentene, hydrocarbyl substituted cyclopentadiene, and mixtures thereof; and~~

a magnetic head adjacent to the magnetic recording medium, the magnetic head sliding on the magnetic recording medium to read and write information on the magnetic recording medium; and

wherein the hydrocarbyl consists of carbon and hydrogen and wherein the hydrocarbyl-substituted cyclopentane comprises at least 29 carbon atoms.

29. (Thrice Amended) A computer, comprising:

a CPU;

a disk drive connected to the CPU so that the disk drive can communicate with the CPU, the disk drive including:

a magnetic recording medium having a magnetic layer over a support and a lubricant layer over the magnetic layer, the lubricant layer ~~including a compound selected from the group consisting of comprising a hydrocarbyl substituted cyclopentane, hydrocarbyl substituted cyclopentene, hydrocarbyl substituted cyclopentadiene, and mixtures thereof; and~~

a magnetic head adjacent to the magnetic recording medium, the magnetic head sliding on the magnetic recording medium to read and write information on the magnetic recording medium; and

wherein the hydrocarbyl consists of carbon and hydrogen and wherein the hydrocarbyl-substituted cyclopentane comprises at least 29 carbon atoms.

30. (Thrice Amended) A method of manufacturing a magnetic recording medium, comprising:

providing a non-magnetic support;

forming a magnetic layer on the support; and

forming a lubricant layer over the magnetic layer, the lubricant layer ~~including a compound selected from the group consisting of~~ comprising a hydrocarbyl substituted cyclopentane, ~~hydrocarbyl-substituted cyclopentene, hydrocarbyl-substituted cyclopentadiene, and mixtures thereof; and~~

wherein the hydrocarbyl consists of carbon and hydrogen and wherein the hydrocarbyl-substituted cyclopentane comprises at least 29 carbon atoms.

33. (Twice Amended) The magnetic recording medium of claim 32, wherein the additives are cyclic phosphazenes, metallic soaps, fatty acids, amides, fatty acid esters, higher aliphatic alcohols, monoalkyl phosphates, dialkyl phosphates, trialkyl phosphates, paraffins, silicone oils, animal oils, vegetable oils, mineral oils, higher aliphatic amines, inorganic fine powders, resin fine powders, unsaturated aliphatic hydrocarbons, or a mixture thereof.

35. (Twice Amended) The magnetic recording medium of claim 34, wherein the additives are cyclic phosphazenes, metallic soaps, fatty acids, amides, fatty acid esters, higher aliphatic alcohols, monoalkyl phosphates, dialkyl phosphates, trialkyl phosphates, paraffins, silicone oils, animal oils, vegetable oils, mineral oils, higher aliphatic amines, inorganic fine powders, resin fine powders, unsaturated aliphatic hydrocarbons, or a mixture thereof.

36. (Once Amended) The magnetic recording medium of claim 1, wherein the lubricant layer including a mixture of two or more lubricants; one lubricant is ~~selected from the group consisting of a~~ hydrocarbyl-substituted cyclopentane ~~cyclopentanes, cyclopentenenes, and cyclopentadienes~~ which are is not functionalized; another lubricant is ~~selected from the group consisting of a~~ hydrocarbyl-substituted cyclopentane ~~cyclopentanes, cyclopentenenes, and cyclopentadienes~~ which are is functionalized.

37. (Once Amended) The magnetic recording medium of claim 13, wherein the lubricant layer including a mixture of two or more lubricants; one lubricant is ~~selected from the group consisting of a~~ hydrocarbyl-substituted cyclopentane ~~cyclopentanes, cyclopentenenes, and cyclopentadienes~~ which are is not functionalized; another lubricant is ~~selected from the group consisting of a~~ hydrocarbyl-substituted cyclopentane ~~cyclopentanes, cyclopentenenes, and cyclopentadienes~~ which are is functionalized.